



Issue Date 28-May-2015

Revision Date 04-Sep-2018

Version 1

## 1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

### Product identifier

**Product Name** Stainless Steel

### Other means of identification

**Product Code**

FRP008

**Synonyms**

Stainless Steel: ATI 20™, ATI 20-20+Nb™, ATI 201™, ATI 219™, 21-6-9, ATI 40 Stainless Steel, XM-11, ATI 301™, ATI 302™, ATI 303™, ATI 304™, ATI 305™, ATI 309™, ATI 310™, ATI 316™, ATI 317™, ATI 321™, ATI 255™ DUPLEX, ATI 332™, ATI 334™, ATI 347™, ATI 348™, AM 350®, AM 355™, ATI 403™, ATI Ohmaloy® 30, ATI Ohmaloy® 40, ATI Ohmaloy®, ATI 409 HP™, ATI 409 Cb™, ATI 410™, ATI 412™, Type 415, ATI 416™, ATI 420™, ATI 430™, ATI 433™, Type 434, Type 436, ATI 439™, ATI 439 HP™, XM-8, Type 441, 18-0, ATI 18CrCb, ATI 441 HP™, ATI 444™, 18-2, ATI 468™, ATI 15-5™, ATI 17-4™, ATI 17-7™, ATI 15-7™, ATI JS700® ALLOY, ATI 800™ ALLOY, ATI 825™ ALLOY, Type 840, ATI E-BRITE® 26-1, ASTM XM 27, ATI 2205™ DUPLEX; 318, ATI 2205™ DUPLEX; 322, ATI 201LN™, Type 301L, ATI 304 DA™, Type 304H, ATI 304L™, 374L, Type 304LN, Type 304N, Type 309H, ATI 309S™, 398, Type 309Si, Type 310Cb, Type 310H, Type 310L, ATI 310S™, Type 310Si, ATI 316L™, 376, ATI 316LN™, ATI 316Ti™, ATI 317L™, ATI 317LMN™, 317 LX, 317 LXN, 317 XN, Type 321H, Type 410 MOD, Type 410HC, ATI 410S™, ATI 418 SPL™, Type 420HC, ALLEGHENY Type 425 Modified, ATI 436S™, ATI 440A™, ATI 440C™, ATI 800 AT™ ALLOY, ATI 800 H™ ALLOY, ATI 904L™, ATI 610™, ATI 611™, ATI 13-8Mo™, ATI 13-8 SuperTough®, ATI 13-8 STAINLESS STEEL, ASTM Type XM-13, ATI 2003® DUPLEX, ATI 20-25+Nb alloy, AL 29-4C®, ATI 332Mo® alloy, ATI 334Mo® alloy, ATI 201HP™, ATI 33, XM-29, ATI 4565™, ATI 50™, 22-13-5, XM-19, ATI 60™, 21800, AL-6XN® ALLOY, AL-6XN Plus® ALLOY, A286 Altemp®, PC1017, Sea Cure® 26-3-3, Zeron® 100, 22-4-9, 21-11N, HOLDER BLOCK STEEL, MAXEL 400 SUPER, AL-6X, AL 404, Type 405, Type 446, AL 29-4C®, AL 29-4, AL 29-4-2, 14-4 FERRITIC, AL 453, AL 466, ALTEMP® ALLOY STEEL, 19-9-DL, Type 302B, ATI 409 Cb™, Type 409Ni, ATI 430Ti™, ALLEGHENY EDRO 441MOD1, ALLEGHENY CRUCIBLE 441MOD2, TOOL STEEL D2T, CSM-21 STAINLESS STEEL, ULTRACHEM STAINLESS STEEL, RA85H STEEL, 385, ZeCor™, RA 330™, ATI304B7 P/M™ BOR7

### Recommended use of the chemical and restrictions on use

**Recommended Use** Stainless steel product manufacture.

**Uses advised against**

### Details of the supplier of the safety data sheet

#### **Manufacturer Address**

ATI, 1000 Six PPG Place, Pittsburgh, PA  
15222 USA

#### **Emergency telephone number**

**Emergency Telephone** Chemtrec: 1-800-424-9300

## 2. HAZARDS IDENTIFICATION

### Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200). This product is an article and, as such, does not present a hazard to human health by inhalation or ingestion.

Skin sensitization	Category 1
Carcinogenicity	Category 1B

Specific target organ toxicity (repeated exposure)

Category 1

**Label elements****Emergency Overview****Danger****Hazard statements**

May cause cancer

May cause an allergic skin reaction

Causes damage to the respiratory tract through prolonged or repeated exposure if inhaled

**Appearance** Various massive product forms**Physical state** Solid**Odor** Odorless**Precautionary Statements - Prevention**

Do not handle until all safety precautions have been read and understood

Use personal protective equipment as required

Wear protective gloves

If skin irritation or rash occurs: Get medical advice/attention

**Precautionary Statements - Disposal**

Dispose of contents/container to an approved waste disposal plant

**Hazards not otherwise classified (HNOC)**

Not applicable

**Other Information**

When product is subjected to welding, burning, melting, sawing, brazing, grinding, buffing, polishing, or other similar heat-generating processes, the following potentially hazardous airborne particles and/or fumes may be generated:: Zinc, copper, magnesium, or cadmium fumes may cause metal fume fever, Titanium dioxide an IARC Group 2B carcinogen, Hexavalent Chromium (Chromium VI) may cause lung, nasal, and/or sinus cancer, Vanadium pentoxide (V2O5) affects eyes, skin, respiratory system, Soluble molybdenum compounds such as molybdenum trioxide may cause lung irritation.

**3. COMPOSITION/INFORMATION ON INGREDIENTS****Synonyms**

Stainless Steel: ATI 20™, ATI 20-20+Nb™, ATI 201™, ATI 219™, 21-6-9, ATI 40 Stainless Steel, XM-11, ATI 301™, ATI 302™, ATI 303™, ATI 304™, ATI 305™, ATI 309™, ATI 310™, ATI 316™, ATI 317™, ATI 321™, ATI 255™ DUPLEX, ATI 332™, ATI 334™, ATI 347™, ATI 348™, AM 350®, AM 355™, ATI 403™, ATI Ohmaloy® 30, ATI Ohmaloy® 40, ATI Ohmaloy®, ATI 409 HP™, ATI 409 Cb™, ATI 410™, ATI 412™, Type 415, ATI 416™, ATI 420™, ATI 430™, ATI 433™, Type 434, Type 436, ATI 439™, ATI 439 HP™, XM-8, Type 441, 18-0, ATI 18CrCb, ATI 441 HP™, ATI 444™, 18-2, ATI 468™, ATI 15-5™, ATI 17-4™, ATI 17-7™, ATI 15-7™, ATI JS700® ALLOY, ATI 800™ ALLOY, ATI 825™ ALLOY, Type 840, ATI E-BRITE® 26-1, ASTM XM 27, ATI 2205™ DUPLEX; 318, ATI 2205™ DUPLEX; 322, ATI 201LN™, Type 301L, ATI 304 DA™, Type 304H, ATI 304L™, 374L, Type 304LN, Type 304N, Type 309H, ATI 309S™, 398, Type 309Si, Type 310Cb, Type 310H, Type 310L, ATI 310S™, Type 310Si, ATI 316L™, 376, ATI 316LN™, ATI 316Ti™, ATI 317L™, ATI 317LMN™, 317 LX, 317 LXN, 317 XN, Type 321H, Type 410 MOD, Type 410HC, ATI 410S™, ATI 418 SPL™, Type 420HC, ALLEGHENY Type 425

Modified, ATI 436S™, ATI 440A™, ATI 440C™, ATI 800 AT™ ALLOY, ATI 800 H™ ALLOY, ATI 904L™, ATI 610™, ATI 611™, ATI 13-8Mo™, ATI 13-8 SuperTough®, ATI 13-8 STAINLESS STEEL, ASTM Type XM-13, ATI 2003® DUPLEX, ATI 20-25+Nb alloy, AL 29-4C®, ATI 332Mo® alloy, ATI 334Mo® alloy, ATI 201HP™, ATI 33, XM-29, ATI 4565™, ATI 50™, 22-13-5, XM-19, ATI 60™, 21800, AL-6XN® ALLOY, AL-6XN Plus® ALLOY, A286 Altemp®, PC1017, Sea Cure ® 26-3-3, Zeron® 100, 22-4-9, 21-11N, HOLDER BLOCK STEEL, MAXEL 400 SUPER, AL-6X, AL 404, Type 405, Type 446, AL 29-4C®, AL 29-4, AL 29-4-2, 14-4 FERRITIC, AL 453, AL 466, ALTEMP® ALLOY STEEL, 19-9-DL, Type 302B, ATI 409 Cb™, Type 409Ni, ATI 430Ti™, ALLEGHENY EDRO 441MOD1, ALLEGHENY CRUCIBLE 441MOD2, TOOL STEEL D2T, CSM-21 STAINLESS STEEL, ULTRACHEM STAINLESS STEEL, RA85H STEEL, 385, ZeCor™, RA 330™, ATI304B7 P/M™ BOR7.

Chemical Name	CAS No.	Weight-%
Iron	7439-89-6	<90
Nickel	7440-02-0	0-46
Chromium	7440-47-3	10-30
Manganese	7439-96-5	0-10
Molybdenum	7439-98-7	0-7.0
Silicon	7440-21-3	0-6.5
Aluminum	7429-90-5	0-4.0
Copper	7440-50-8	0-4.0
Tungsten	7440-33-7	0-2.5
Titanium	7440-32-6	0-2.4
Boron	7440-42-8	0-2.25
Vanadium	7440-62-2	0-1.1
Tantalum	7440-25-7	0-1.0
Niobium (Columbium)	7440-03-1	0-1.0
Cobalt	7440-48-4	0-0.5

#### 4. FIRST AID MEASURES

##### First aid measures

<b>Eye contact</b>	In the case of particles coming in contact with eyes during processing, treat as with any foreign object.
<b>Skin Contact</b>	In the case of skin allergic reactions see a physician.
<b>Inhalation</b>	If excessive amounts of smoke, fume, or particulate are inhaled during processing, remove to fresh air and consult a qualified health professional.
<b>Ingestion</b>	Not an expected route of exposure.

##### Most important symptoms and effects, both acute and delayed

**Symptoms** May cause allergic skin reaction.

##### Indication of any immediate medical attention and special treatment needed

**Note to physicians** Treat symptomatically.

#### 5. FIRE-FIGHTING MEASURES

##### Suitable extinguishing media

Product not flammable in the form as distributed, flammable as finely divided particles or pieces resulting from processing of this product. Isolate large fires and allow to burn out. Smother small fires with salt (NaCl) or class D dry powder fire extinguisher.

**Unsuitable extinguishing media** Do not spray water on burning metal as an explosion may occur. This explosive characteristic is caused by the hydrogen and steam generated by the reaction of water with

the burning material.

#### **Specific hazards arising from the chemical**

Intense heat. Very fine, high surface area material resulting from grinding, buffing, polishing, or similar processes of this product may ignite spontaneously at room temperature. **WARNING:** Fine particles resulting from grinding, buffing, polishing, or similar processes of this product may form combustible dust-air mixtures. Keep particles away from all ignition sources including heat, sparks, and flame. Prevent dust accumulations to minimize combustible dust hazard.

**Hazardous combustion products** Titanium dioxide an IARC Group 2B carcinogen. Hexavalent Chromium (Chromium VI) may cause lung, nasal, and/or sinus cancer. Vanadium pentoxide (V2O5) affects eyes, skin, respiratory system. Zinc, copper, magnesium, or cadmium fumes may cause metal fume fever. Soluble molybdenum compounds such as molybdenum trioxide may cause lung irritation.

#### **Explosion data**

**Sensitivity to Mechanical Impact** None.

**Sensitivity to Static Discharge** None.

#### **Protective equipment and precautions for firefighters**

Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear.

## **6. ACCIDENTAL RELEASE MEASURES**

#### **Personal precautions, protective equipment and emergency procedures**

**Personal precautions** Use personal protective equipment as required.

**For emergency responders** Use personal protective equipment as required.

#### **Environmental precautions**

**Environmental precautions** Not applicable to massive product.

#### **Methods and material for containment and cleaning up**

**Methods for containment** Not applicable to massive product.

**Methods for cleaning up** Not applicable to massive product.

## **7. HANDLING AND STORAGE**

#### **Precautions for safe handling**

**Advice on safe handling** Very fine, high surface area material resulting from grinding, buffing, polishing, or similar processes of this product may ignite spontaneously at room temperature. **WARNING:** Fine particles resulting from grinding, buffing, polishing, or similar processes of this product may form combustible dust-air mixtures. Keep particles away from all ignition sources including heat, sparks, and flame. Prevent dust accumulations to minimize combustible dust hazard.

#### **Conditions for safe storage, including any incompatibilities**

**Storage Conditions** Keep chips, turnings, dust, and other small particles away from heat, sparks, flame and other sources of ignition (i.e., pilot lights, electric motors and static electricity).

**Incompatible materials** Dissolves in hydrofluoric acid. Ignites in the presence of fluorine. When heated above 200°C, reacts exothermically with the following: Chlorine, bromine, halocarbons, carbon tetrachloride, carbon tetrafluoride, and freon.

## **8. EXPOSURE CONTROLS/PERSONAL PROTECTION**

#### **Control parameters**

**Exposure Guidelines**

Chemical Name	ACGIH TLV	OSHA PEL
Iron 7439-89-6	-	-
Nickel 7440-02-0	TWA: 1.5 mg/m <sup>3</sup> inhalable fraction	TWA: 1 mg/m <sup>3</sup>
Chromium 7440-47-3	TWA: 0.5 mg/m <sup>3</sup>	TWA: 1 mg/m <sup>3</sup>
Manganese 7439-96-5	TWA: 0.02 mg/m <sup>3</sup> respirable fraction TWA: 0.1 mg/m <sup>3</sup> inhalable fraction TWA: 0.02 mg/m <sup>3</sup> Mn TWA: 0.1 mg/m <sup>3</sup> Mn	(vacated) STEL: 3 mg/m <sup>3</sup> fume (vacated) Ceiling: 5 mg/m <sup>3</sup> Ceiling: 5 mg/m <sup>3</sup> fume Ceiling: 5 mg/m <sup>3</sup> Mn
Molybdenum 7439-98-7	TWA: 10 mg/m <sup>3</sup> inhalable fraction TWA: 3 mg/m <sup>3</sup> respirable fraction	-
Silicon 7440-21-3	-	TWA: 15 mg/m <sup>3</sup> total dust TWA: 5 mg/m <sup>3</sup> respirable fraction
Copper 7440-50-8	TWA: 0.2 mg/m <sup>3</sup> fume TWA: 1 mg/m <sup>3</sup> Cu dust and mist	TWA: 0.1 mg/m <sup>3</sup> fume TWA: 1 mg/m <sup>3</sup> dust and mist
Aluminum 7429-90-5	TWA: 1 mg/m <sup>3</sup> respirable fraction	TWA: 15 mg/m <sup>3</sup> total dust TWA: 5 mg/m <sup>3</sup> respirable fraction
Tungsten 7440-33-7	STEL: 10 mg/m <sup>3</sup> STEL: 10 mg/m <sup>3</sup> W TWA: 5 mg/m <sup>3</sup> TWA: 5 mg/m <sup>3</sup> W	(vacated) STEL: 10 mg/m <sup>3</sup> (vacated) STEL: 10 mg/m <sup>3</sup> W
Titanium 7440-32-6	-	-
Boron 7440-42-8	-	-
Vanadium 7440-62-2	-	Ceiling: 0.5 mg/m <sup>3</sup> V <sub>2</sub> O <sub>5</sub> respirable dust Ceiling: 0.1 mg/m <sup>3</sup> V <sub>2</sub> O <sub>5</sub> fume
Tantalum 7440-25-7	-	TWA: 5 mg/m <sup>3</sup>
Niobium (Columbium) 7440-03-1	-	-
Cobalt 7440-48-4	TWA: 0.02 mg/m <sup>3</sup> TWA: 0.02 mg/m <sup>3</sup> Co	TWA: 0.1 mg/m <sup>3</sup> dust and fume

**Appropriate engineering controls****Engineering Controls**

Avoid generation of uncontrolled particles.

**Individual protection measures, such as personal protective equipment****Eye/face protection**

When airborne particles may be present, appropriate eye protection is recommended. For example, tight-fitting goggles, foam-lined safety glasses or other protective equipment that shield the eyes from particles.

**Skin and body protection**

Fire/flame resistant/retardant clothing may be appropriate during hot work with the product. Cut-resistant gloves and/or protective clothing may be appropriate when sharp surfaces are present.

**Respiratory protection**

When particulates/fumes/gases are generated and if exposure limits are exceeded or irritation is experienced, proper approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.

**General Hygiene Considerations**

Handle in accordance with good industrial hygiene and safety practice.

**9. PHYSICAL AND CHEMICAL PROPERTIES****Information on basic physical and chemical properties**

**Physical state**  
**Appearance**  
**Color**

Solid  
Various massive product forms  
metallic, gray or silver

**Odor**  
**Odor threshold**

Odorless  
Not applicable

<u>Property</u>	<u>Values</u>	<u>Remarks • Method</u>
pH	-	
Melting point/freezing point	1430-1540 °C / 2600-2800 °F	
Boiling point / boiling range	-	
Flash point	-	
Evaporation rate	-	Not applicable
Flammability (solid, gas)	-	Product not flammable in the form as distributed, flammable as finely divided particles or pieces resulting from processing of this product
<b>Flammability Limit in Air</b>		
Upper flammability limit:	-	
Lower flammability limit:	-	
Vapor pressure	-	Not applicable
Vapor density	-	Not applicable
Specific Gravity	7-9	
Water solubility	Insoluble	
Solubility in other solvents	-	Not applicable
Partition coefficient	-	Not applicable
Autoignition temperature	-	Not applicable
Decomposition temperature	-	Not applicable
Kinematic viscosity	-	Not applicable
Dynamic viscosity	-	Not applicable
Explosive properties	Not applicable	
Oxidizing properties	Not applicable	
<b>Other Information</b>		
Softening point	-	
Molecular weight	-	
VOC Content (%)	Not applicable	
Density	-	
Bulk density	-	

## 10. STABILITY AND REACTIVITY

### Reactivity

Not applicable

### Chemical stability

Stable under normal conditions.

### Possibility of Hazardous Reactions

None under normal processing.

#### **Hazardous polymerization**

Hazardous polymerization does not occur.

### Conditions to avoid

Dust formation and dust accumulation.

### Incompatible materials

Dissolves in hydrofluoric acid. Ignites in the presence of fluorine. When heated above 200°C, reacts exothermically with the following: Chlorine, bromine, halocarbons, carbon tetrachloride, carbon tetrafluoride, and freon.

### Hazardous Decomposition Products

When product is subjected to welding, burning, melting, sawing, brazing, grinding, buffing, polishing, or other similar heat-generating processes, the following potentially hazardous airborne particles and/or fumes may be generated:: Titanium dioxide an IARC Group 2B carcinogen. Hexavalent Chromium (Chromium VI) may cause lung, nasal, and/or sinus cancer. Vanadium pentoxide (V2O5) affects eyes, skin, respiratory system. Soluble molybdenum compounds such as molybdenum trioxide may cause lung irritation.

## 11. TOXICOLOGICAL INFORMATION

### Information on likely routes of exposure

#### Product Information

<b>Inhalation</b>	Not an expected route of exposure for product in massive form.
<b>Eye contact</b>	Not an expected route of exposure for product in massive form.
<b>Skin Contact</b>	Nickel or Cobalt containing alloys may cause sensitization by skin contact.
<b>Ingestion</b>	Not an expected route of exposure for product in massive form.

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50
Iron 7439-89-6	98,600 mg/kg bw	-	> 0.25 mg/L
Nickel 7440-02-0	> 9000 mg/kg bw	-	> 10.2 mg/L
Chromium 7440-47-3	> 3400 mg/kg bw	-	> 5.41 mg/L
Manganese 7439-96-5	>2000 mg/kg bw	-	>5.14 mg/L
Molybdenum 7439-98-7	> 2000 mg/kg bw	> 2000 mg/kg bw	> 5.10 mg/L
Silicon 7440-21-3	> 5000 mg/kg bw	> 5000 mg/kg bw	> 2.08 mg/L
Copper 7440-50-8	481 mg/kg bw	>2000 mg/kg bw	>5.11 mg/L
Aluminum 7429-90-5	15,900 mg/kg bw	-	> 1 mg/L
Tungsten 7440-33-7	> 2000 mg/kg bw	> 2000 mg/kg bw	> 5.4 mg/L
Titanium 7440-32-6	> 5000 mg/kg bw	-	-
Boron 7440-42-8	> 2000 mg/kg bw	-	> 5.08 mg/L
Vanadium 7440-62-2	> 2000 mg/kg bw	-	-
Tantalum 7440-25-7	> 2000 mg/kg bw	> 2000 mg/kg bw	> 5.18 mg/L
Niobium (Columbium) 7440-03-1	> 10,000 mg/kg bw	> 2000 mg/kg bw	-
Cobalt 7440-48-4	550 mg/kg bw	>2000 mg/kg bw	<0.05 mg/L

### Information on toxicological effects

**Symptoms** Nickel or Cobalt containing alloys may cause sensitization by skin contact.

### Delayed and immediate effects as well as chronic effects from short and long-term exposure

<b>Acute toxicity</b>	Product not classified.
<b>Skin corrosion/irritation</b>	Product not classified.
<b>Serious eye damage/eye irritation</b>	Product not classified.
<b>Sensitization</b>	Nickel or Cobalt containing alloys may cause sensitization by skin contact. Cobalt-containing alloys may cause sensitization by inhalation.
<b>Germ cell mutagenicity</b>	Product not classified.
<b>Carcinogenicity</b>	May cause cancer by inhalation.

Chemical Name	ACGIH	IARC	NTP	OSHA
Nickel 7440-02-0		Group 1 Group 2B	Known Reasonably Anticipated	X
Chromium 7440-47-3		Group 3		

Cobalt 7440-48-4	A3	Group 2A Group 2B	Known	X
---------------------	----	----------------------	-------	---

<b>Reproductive toxicity</b>	Product not classified.
<b>STOT - single exposure</b>	Product not classified.
<b>STOT - repeated exposure</b>	Causes disorder and damage to the: Respiratory System.
<b>Aspiration hazard</b>	Product not classified.

## 12. ECOLOGICAL INFORMATION

### Ecotoxicity

This product as shipped is not classified for aquatic toxicity.

Chemical Name	Algae/aquatic plants	Fish	Toxicity to microorganisms	Crustacea
Iron 7439-89-6	-	The 96 h LC50 of 50% iron oxide black in water to Danio rerio was greater than 10,000 mg/L.	The 3 h EC50 of iron oxide for activated sludge was greater than 10,000 mg/L.	The 48 h EC50 of iron oxide to Daphnia magna was greater than 100 mg/L.
Nickel 7440-02-0	NOEC/EC10 values range from 12.3 µg/l for <i>Scenedesmus accuminatus</i> to 425 µg/l for <i>Pseudokirchneriella subcapitata</i> .	The 96h LC50s values range from 0.4 mg Ni/L for <i>Pimephales promelas</i> to 320 mg Ni/L for <i>Brachydanio rerio</i> .	The 30 min EC50 of nickel for activated sludge was 33 mg Ni/L.	The 48h LC50s values range from 0.013 mg Ni/L for <i>Ceriodaphnia dubia</i> to 4970 mg Ni/L for <i>Daphnia magna</i> .
Chromium 7440-47-3	-	-	-	-
Manganese 7439-96-5	The 72 h EC50 of manganese to <i>Desmodesmus subspicatus</i> was 2.8 mg of Mn/L.	The 96 h LC50 of manganese to <i>Oncorhynchus mykiss</i> was greater than 3.6 mg of Mn/L.	The 3 h EC50 of manganese for activated sludge was greater than 1000 mg/L.	The 48 h EC50 of manganese to <i>Daphnia magna</i> was greater than 1.6 mg/L.
Molybdenum 7439-98-7	The 72 h EC50 of sodium molybdate dihydrate to <i>Pseudokirchneriella subcapitata</i> was 362.9 mg of Mo/L.	The 96 h LC50 of sodium molybdate dihydrate to <i>Pimephales promelas</i> was 644.2 mg/L.	The 3 h EC50 of molybdenum trioxide for activated sludge was 820 mg/L.	The 48 h LC50 of sodium molybdate dihydrate to <i>Ceriodaphnia dubia</i> was 1,015 mg/L. The 48 h LC50 of sodium molybdate dihydrate to <i>Daphnia magna</i> was greater than 1,727.8 mg/L.
Silicon 7440-21-3	The 72 h EC50 of sodium metasilicate pentahydrate to <i>Pseudokirchnerella subcapitata</i> was greater than 250 mg/L.	-	-	-
Copper 7440-50-8	The 72 h EC50 values of copper chloride to <i>Pseudokirchneriella subcapitata</i> ranged between 30 µg/L (pH 7.02, hardness 250 mg/L CaCO <sub>3</sub> , DOC 1.95 mg/L) and 824 µg/L (pH 6.22, hardness 100 mg/L CaCO <sub>3</sub> , DOC 15.8 mg/L).	The 96-hr LC50 for <i>Pimephales promelas</i> exposed to Copper sulfate ranged from 256.2 to 38.4 µg/L with water hardness increasing from 45 to 255.7 mg/L.	The 24 h NOEC of copper chloride for activated sludge ranged from 0.32 to 0.64 mg of Cu/L.	The 48 h LC50 values for <i>Daphnia magna</i> exposed to copper in natural water ranged between 33.8 µg/L (pH 6.1, hardness 12.4 mg/L CaCO <sub>3</sub> , DOC 2.34 mg/L) and 792 µg/L (pH 7.35, hardness 139.7 mg/L CaCO <sub>3</sub> , DOC 22.8 mg/L).
Aluminum 7429-90-5	The 96-h EC50 values for reduction of biomass of <i>Pseudokirchneriella subcapitata</i> in AAP-Medium at pH 6, 7, and 8 were estimated as 20.1, 5.4, and 150.6 µg/L, respectively, for dissolved Al.	The 96 h LC50 of aluminum to <i>Oncorhynchus mykiss</i> was 7.4 mg of Al/L at pH 6.5 and 14.6 mg of Al/L at pH 7.5	-	The 48-hr LC50 for <i>Ceriodaphnia dubia</i> exposed to Aluminium chloride increased from 0.72 to greater than 99.6 mg/L with water hardness increasing from 25 to 200 mg/L.
Tungsten 7440-33-7	The 72 h EC50 of sodium tungstate to <i>Pseudokirchnerella subcapitata</i> was 31.0 mg of W/L.	The 96 h LC50 of sodium tungstate to <i>Danio rerio</i> was greater than 106 mg of W/L.	The 30 min EC50 of sodium tungstate for activated sludge were greater than 1000 mg/L.	The 48 h EC50 of sodium tungstate to <i>Daphnia magna</i> was greater than 96 mg of W/L.



Titanium 7440-32-6	The 72 h EC50 of titanium dioxide to <i>Pseudokirchnerella subcapitata</i> was 61 mg of TiO <sub>2</sub> /L.	The 96 h LC50 of titanium dioxide to <i>Cyprinodon variegatus</i> was greater than 10,000 mg of TiO <sub>2</sub> /L. The 96 h LC50 of titanium dioxide to <i>Pimephales promelas</i> was greater than 1,000 mg of TiO <sub>2</sub> /L .	The 3 h EC50 of titanium dioxide for activated sludge were greater than 1000 mg/L.	The 48 h EC50 of titanium dioxide to <i>Daphnia Magna</i> was greater than 1000 mg of TiO <sub>2</sub> /L.
Boron 7440-42-8	The 72-h EC50 value for reduction of biomass of <i>Pseudokirchnerella subcapitata</i> exposed to Boric acid at pH 7.5 to 8.3 was 40.2 mg/L.	The 96-hr LC50 for <i>Pimephales promelas</i> exposed to Boric acid (82%)/borax (18%) mixture was 79.7 mg/L with water hardness of 91 mg/L and water pH of 8.0.	The 3 h NOEC of boric acid for activated sludge ranged from 17.5 to 20 mg/L.	The 48-hr LC50 for <i>Ceriodaphnia dubia</i> exposed to Boric acid/borax mixture ranged from 91 to 165 mg/L with pH ranging from 6.7 to 8.4.
Vanadium 7440-62-2	The 72 h EC50 of vanadium pentoxide to <i>Desmodesmus subspicatus</i> was 2,907 ug of V/L.	The 96 h LC50 of vanadium pentoxide to <i>Pimephales promelas</i> was 1,850 ug of V/L .	The 3 h EC50 of sodium metavanadate for activated sludge was greater than 100 mg/L.	The 48 h EC50 of sodium vanadate to <i>Daphnia magna</i> was 2,661 ug of V/L.
Tantalum 7440-25-7	-	-	-	-
Niobium (Columbium) 7440-03-1	-	-	-	-
Cobalt 7440-48-4	The 72 h EC50 of cobalt dichloride to <i>Pseudokirchnerella subcapitata</i> was 144 ug of Co/L.	The 96h LC50 of cobalt dichloride ranged from 1.5 mg Co/L for <i>Oncorhynchus mykiss</i> to 85 mg Co/L for <i>Danio rerio</i> .	The 3 h EC50 of cobalt dichloride for activated sludge was 120 mg of Co/L.	The 48 h LC50 of cobalt dichloride ranged from 0.61 mg Co/L for <i>Ceriodaphnia dubia</i> tested in soft, DOM-free water to >1800mg Co/L for <i>Tubifex tubifex</i> in very hard water.

**Persistence and degradability**

.

**Bioaccumulation**

.

**Other adverse effects**

This product as shipped is not classified for environmental endpoints. However, when subjected to sawing or grinding, particles may be generated that are classified for aquatic chronic toxicity.

### 13. DISPOSAL CONSIDERATIONS

**Waste treatment methods****Disposal of wastes**

Disposal should be in accordance with applicable regional, national and local laws and regulations.

**Contaminated packaging**

None anticipated.

Chemical Name	RCRA - D Series Wastes
Chromium 7440-47-3	5.0 mg/L regulatory level

This product contains one or more substances that are listed with the State of California as a hazardous waste.

### 14. TRANSPORT INFORMATION

**DOT**

Not regulated

### 15. REGULATORY INFORMATION

**International Inventories**

<b>TSCA</b>	Complies
<b>DSL/NDSL</b>	Complies
<b>EINECS/ELINCS</b>	Complies
<b>ENCS</b>	Complies
<b>IECSC</b>	Complies
<b>KECL</b>	Complies
<b>PICCS</b>	Not Listed
<b>AICS</b>	Complies

**Legend:**

**TSCA** - United States Toxic Substances Control Act Section 8(b) Inventory  
**DSL/NDSL** - Canadian Domestic Substances List/Non-Domestic Substances List  
**EINECS/ELINCS** - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances  
**ENCS** - Japan Existing and New Chemical Substances  
**IECSC** - China Inventory of Existing Chemical Substances  
**KECL** - Korean Existing and Evaluated Chemical Substances  
**PICCS** - Philippines Inventory of Chemicals and Chemical Substances  
**AICS** - Australian Inventory of Chemical Substances

**US Federal Regulations****SARA 313**

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product contains a chemical or chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372: Chromium (Cr)

Chemical Name	CAS No.	Weight-%	SARA 313 - Threshold Values %
Nickel - 7440-02-0	7440-02-0	0-46	0.1
Chromium - 7440-47-3	7440-47-3	10-30	1.0
Manganese - 7439-96-5	7439-96-5	0-10	1.0
Copper - 7440-50-8	7440-50-8	0-4.0	1.0
Cobalt - 7440-48-4	7440-48-4	0-0.5	0.1

**SARA 311/312 Hazard Categories**

<b>Acute health hazard</b>	Yes
<b>Chronic Health Hazard</b>	Yes
<b>Fire hazard</b>	No
<b>Sudden release of pressure hazard</b>	No
<b>Reactive Hazard</b>	No

**CWA (Clean Water Act)**

This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

Chemical Name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Nickel 7440-02-0		X	X	
Chromium 7440-47-3		X	X	
Copper 7440-50-8		X	X	

**CERCLA**

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Chemical Name	Hazardous Substances RQs
Nickel 7440-02-0	100 lb
Chromium 7440-47-3	5000 lb
Copper	5000 lb

7440-50-8

**US State Regulations****California Proposition 65**

This product contains the Proposition 65 chemicals listed below. Proposition 65 warning label available at ATImetals.com.

Chemical Name	California Proposition 65
Nickel - 7440-02-0	Carcinogen
Cobalt - 7440-48-4	Carcinogen

**U.S. State Right-to-Know Regulations**

Chemical Name	New Jersey	Massachusetts	Pennsylvania
Nickel 7440-02-0	X	X	X
Chromium 7440-47-3	X	X	X
Manganese 7439-96-5	X	X	X
Molybdenum 7439-98-7	X	X	X
Silicon 7440-21-3	X	X	X
Copper 7440-50-8	X	X	X
Aluminum 7429-90-5	X	X	X
Tungsten 7440-33-7	X	X	X
Titanium 7440-32-6	X		
Vanadium 7440-62-2	X	X	X
Tantalum 7440-25-7	X	X	X
Cobalt 7440-48-4	X	X	X

**U.S. EPA Label Information**

**EPA Pesticide Registration Number** Not applicable

**16. OTHER INFORMATION**

<b>NFPA</b>	Health hazards 1	Flammability 0	Instability 0	Physical and Chemical Properties -
<b>HMIS</b>	Health hazards 2*	Flammability 0	Physical hazards 0	Personal protection X
<i>Chronic Hazard Star Legend</i>	<i>* = Chronic Health Hazard</i>			

**Issue Date** 28-May-2015

**Revision Date** 04-Sep-2018

**Revision Note**

Updated Section(s): 2, 3, 4, 5, 9, 11, 12, 15

**Note:**

The information provided in this safety data sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

**End of Safety Data Sheet**

**Additional information available from:** Safety data sheets and labels available at ATImetals.com